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A new species of *Petracola* (Squamata: Gymnophthalmidae) from Río Abiseo National Park, San Martín, Peru

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Abstract.—A new species of *Petracola* is described from Río Abiseo National Park in northeastern Peru, where it inhabits grasslands above montane forest at 3,230 m asl. The new species is diagnosed by a unique combination of morphometric, scalation, and color pattern characteristics, increasing the number of described *Petracola* species to five.

Keywords. Andean lizard, Cercosaurini, Gran Pajatén, Huallaga basin, montane forest, Reptilia

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Introduction

The genus *Petracola* Doan and Castoe 2005 is a lineage of semifossorial lizards distributed in the central and northern Andes of Peru (Doan and Castoe 2005; Echevarria and Venegas 2015; Kizirian et al. 2008; Köhler and Lehr 2004; Uzzell 1970). These small lizards occur in cloud forest, montane forest, and wet puna from 1,889 m to 3,600 m asl (Echevarria and Venegas 2015; Kizirian et al. 2008; Köhler and Lehr 2004).

The genus *Petracola* was created to resolve the polyphyly of *Proctoporus* (Doan and Castoe 2005) and was nested in Cercosaurinae as sister lineage of a lineage formed by *Cercosaura*, *Dendrosauridion*, *Potamites*, *Proctoporus*, *Selvasaura*, and *Wilsonosaura* (Torres-Carvajal et al. 2016; Moravec et al. 2018; Vasquez-Restrepo et al. 2019). It currently includes four species: *P. angustisoma* Echevarria and Venegas 2015, *P. waka* Kizirian, Bayefsky-Anand, Eriksson, Le, and Donnelly 2008, *P. labioocularis* (Köhler and Lehr 2004), and *P. ventrimaculatus* (Boulenger 1900). Compared to its close relatives, *P. ventrimaculatus* has a relatively extensive geographic distribution, including both sides of the Marañón River (Kizirian et al. 2008); furthermore, osteological, morphological, and ecological evidence suggest it could be a complex of species (Echevarria 2014).

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In 1987, during a faunal inventory expedition to the upper part of the Río Abiseo National Park, Perú, the first author (LOR) collected five specimens with characteristics matching the *Petracola ventrimaculatus* group and deposited them in the herpetology collection of Museo de Historia Natural de la Universidad Nacional Mayor de San Marcos (MUSM). In this paper, this new species of *Petracola* is described based on morphological data, increasing the number of species to five.

Materials and Methods

Specimens and ecological data were collected in Río Abiseo National Park in 1987 by the first author (LOR). Specimens were collected by hand, euthanized, fixed in 10% formalin, and later transferred to 70% ethanol. Terminology for diagnostics and descriptions follows Kizirian (1996) and Goicoechea et al. (2013). Measurements were taken with calipers accurate to 0.1 mm. Data for other species were taken from the literature (Echevarria and Venegas 2015; Kizirian et al. 2008; Köhler and Lehr 2004) and by examination of specimens deposited in the Museo de Historia Natural de la Universidad Nacional de San Marcos (MUSM), Lima, Peru, and the Museo de Biodiversidad del Perú (MUBI), Cusco, Peru (Appendix I).

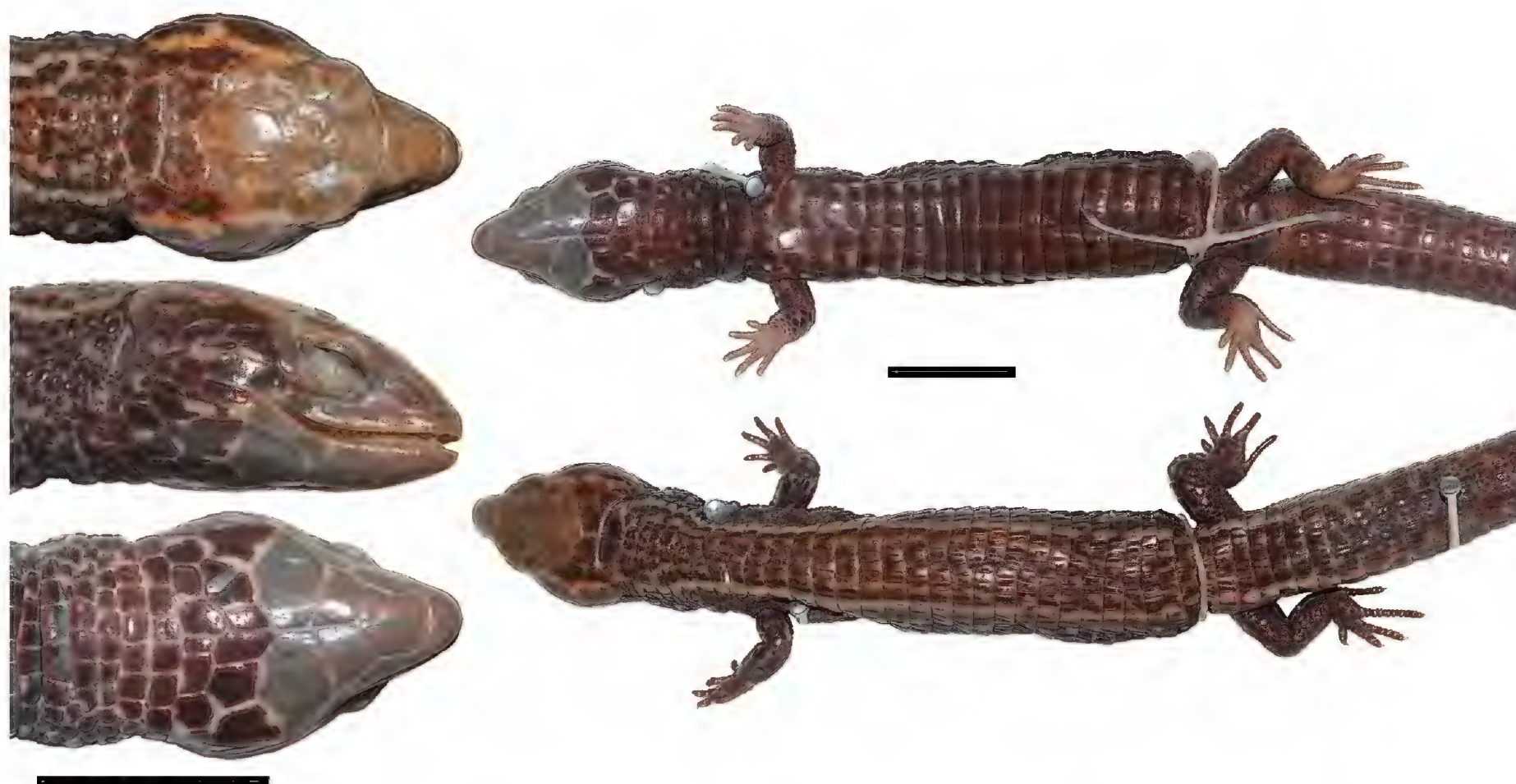


Fig. 1. Holotype of *Petracola pajatensis* sp. nov. (MUSM 3829; male, SVL = 60.5, Tail = 76.8 mm, scale bar = 10 mm).

Results

Generic Assignment

The new species is assigned to *Petracola* based on the presence of imbricate and scale-like papillae on the tongue, head scales without striations or rugosities, smooth and juxtaposed dorsal scales, and the absence of prefrontal scales (Doan and Castoe 2005).

Taxonomy

Petracola pajatensis sp. nov.

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Holotype. MUSM 3829, adult male (Figs. 1–2) from Los Chochos, Rio Abiseo National Park, Provincia Mariscal Cáceres, Departamento San Martín, Peru, approximately 3,230 m asl, 18 km airline from Pataz (7°38'13"S, 77°28'80"W), collected by Lily O. Rodríguez on 12 July 1987.

Paratypes. Three adult females (MUSM 3830 [Fig. 2], 15986–87), and one subadult male (MUSM 15985), same data as holotype.

Diagnosis. (1) Frontonasal and frontal scales sub-equal; (2) nasoloreal suture present, loreal scale not in contact with supralabials; (3) supraoculars two; (4) superciliaries two, discontinuous, first expanded onto dorsal surface of head; (5) postoculars two; (6) palpebral disc divided in two; (7) three supralabials anterior to the posteroventral angle of subocular; (8) two pairs of genials in contact;

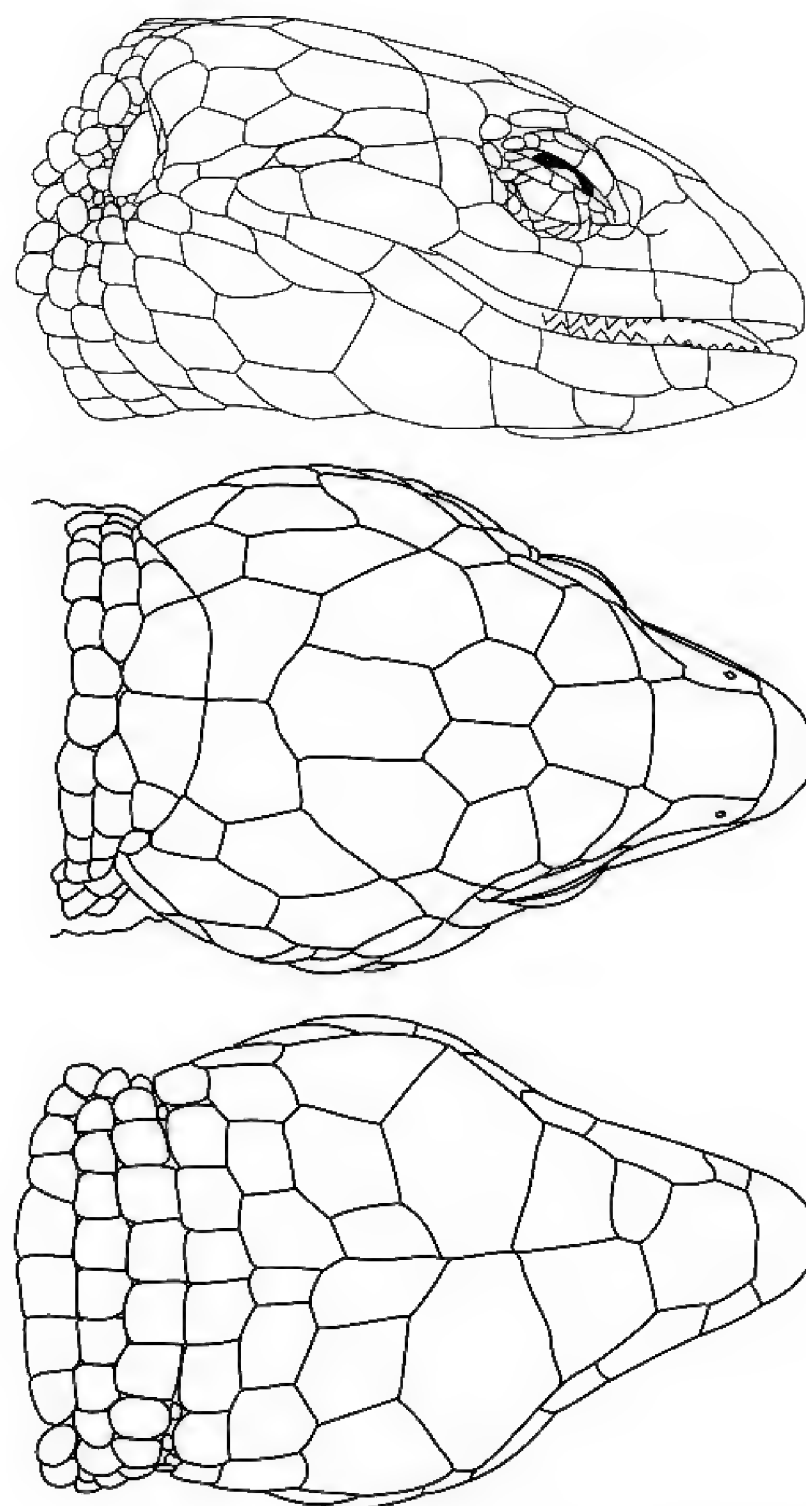


Fig. 2. Dorsal, lateral, and ventral views of head of the holotype (MUSM 3829).



Fig. 3. Dorsal and ventral views of the paratype of *Petracola pajatensis* **sp. nov.** (MUSM 3830; female, SVL = 65.1, Tail = 64.3 mm).

(9) dorsal body scales quadrangular, smooth, juxtaposed; (10) transverse dorsal rows 33–35; (11) transversal ventral rows 20–22; (12) a continuous series of small lateral scales separates dorsals from ventrals; (13) posterior cloacal plate scales 2–5; (14) anterior preanal plate scales paired; (15) femoral pores per hind limb in males 6–8, in females three; (16) preanal pores absent; (17) subdigital lamellae on finger IV eight; (18) limbs not overlapping when adpressed against body on adults; (19) pentadactyl, digits clawed; (20) coloration in liquid preservative: in males, dorsum is light-brown with numerous irregular dark-brown spots and venter is dark-brown with some small cream spots on their flanks; in females, dorsum is light-brown with some and irregular dark-brown spots, venter is brown with cream spots that form discontinuous transversal bands from the chest to the anal plate (Fig. 3).

Petracola pajatensis **sp. nov.** can be distinguished from *P. angustisoma* by having a robust body, two discontinuous superciliaries, 6–8 femoral pores per hind limb in males, maximum SVL in males 60.5 mm, dorsum is light-brown with irregular dark brown spots not forming longitudinal stripes, venter is brown in preservative (gracile body, three discontinuous superciliaries, nine femoral pores per hind limb in males, maximum SVL in males 43.6 mm, dorsum is brown or olive with seven discontinuous dark brown longitudinal stripes, venter is white with black semicircular black spots on anterior margin of scales); from *P. labioocularis* by having two supraoculars, absence of precloacal pores, and two pairs of genials in contact (three supraoculars, presence of precloacal pores, and usually three pairs of genials in contact); from *P. ventrimaculatus* by having 6–8 femoral pores in males, in preservative the venter

in males is dark brown with small lateral cream spots, in females it is a combination of cream with brown forming longitudinal bands, and maximum SVL in males 60 mm (2–5 femoral pores in males, in males and females the venter is cream with a bold black transversal band, and maximum SVL in males 71.05 mm); from *P. waka* by having two discontinuous superciliaries, two genials in contact, and venter in males is a dark brown with lateral cream spots, in females the venter is a combination of cream with brown forming a longitudinal band (four continuous superciliaries, three genials in contact, and the venter in males is white to pale yellow with brown spots).

Description of the holotype. Adult male, snout-vent length (SVL) 60.5 mm, tail length 76.8 mm, head scales smooth, rounded in lateral and ventral views, without striations or rugosities; rostral scale wider than tall, in contact with frontonasal, nasals, and first supralabials; frontonasal longer than wide, longer than the frontal scale, widest posteriorly, in contact with rostral, nasal, first superciliary, and frontal; prefrontal absent; frontal longer than wide, pentagonal, in contact with first superciliary, first supraocular, and frontoparietal; frontoparietal paired, polygonal (hexagonal), in contact with frontal, supraoculars, parietals, and interparietals; supraoculars two, the first separates the first and second superciliaries, in contact with superciliaries, frontal, frontoparietals, interparietal, and postoculars; parietals longer than wide, polygonal (irregular hexagon), in contact with frontoparietals and supraoculars anteriorly, with interparietal, and temporals laterally, and with postparietals posteriorly; interparietal polygonal (hexagonal), in contact with frontoparietals anteriorly, with parietals laterally, and with postparietal



Fig. 4. Dorsolateral view of unvouchered living specimen from Los Chochos. *Photo by Ken R. Young.*

posteriorly; postparietals paired, smaller than parietals, and polygonal. Nasal scale divided, longer than high, in contact with first supralabials; loreal scale present on the left side, nasoloreal suture incomplete on the right side, not in contact with the supralabials; two superciliaries, discontinuous, and first expanded onto the dorsal surface of the head; two preoculars; frenocular fused with the first subocular only on the right side; palpebral disc transparent and divided in two; three suboculars, on the right side the first subocular is fused with the frenocular; two postoculars; temporals smooth, polygonal; three supralabials anterior to posteroventral angle of suboculars. Mental wider than long, in contact with first infralabials and postmental posteriorly; postmental single, polygonal (irregular heptagonal), in contact with the first and second infralabials, and the first pair of genials; 3/2 genials, on right and left sides respectively, all in contact medially, the first genial on right side is divided; three transversal rows of preangular scales; six gular scale rows, polygonal, and smooth. Dorsal scales rectangular, longer than wide, juxtaposed, smooth, 33 transverse rows; 21 longitudinal dorsal scale rows at midbody; a continuous series of small lateral scales; reduced scales at limb insertion region present; 21 transverse ventral scale rows; 10 longitudinal ventral scale rows at midbody, the lateral scales are slightly smaller; anterior preanal plate scales paired; three posterior preanal plate scales, and a small and polygonal scale lies between the anterior and posterior preanal plate scales; scales on the tail rectangular, juxtaposed, and smooth; ventral scales quadrangular, juxtaposed, and smooth. Limbs pentadactyl; digits clawed; dorsal brachial scales polygonal, subimbricate, and smooth; ventral brachial scales rounded, subimbricate, and smooth; dorsal antebrachial scales polygonal, smooth; ventral antebrachial scales polygonal, smooth, smaller than dorsal; dorsal manus scales polygonal, smooth, subimbricate; palmar scales small, rounded, juxtaposed, and domelike; dorsal scales on fingers smooth, quad-

angular, imbricate, three on finger I, five on II, six on III, five on IV, and four on V; scales on anterodorsal surface of thigh polygonal, smooth, subimbricate; scales on posterior surface of thigh small, rounded, and juxtaposed; scales on ventral surface of thigh small, polygonal and juxtaposed; six femoral pores on left thigh and seven on right; scales on anterior surface of crus polygonal, smooth, juxtaposed, decreasing in size distally; scales on posterodorsal surface of crus smooth, polygonal, juxtaposed; scales on ventral surface of crus polygonal, enlarged, smooth, and subimbricate; scales on dorsal surface of toes polygonal, smooth, and subimbricate; scales on ventral surface of toes rounded, small, and domelike; dorsal scales of toes smooth, imbricate, two on toe I, five on toe II, seven on toe III, ten on toe IV, and six on toe V.

Coloration

In preservative. *Petracola pajatensis* **sp. nov.** exhibits a variable coloration in adults of both sexes. The males (Fig. 1) have a light-brown dorsum with numerous and irregular dark-brown spots, with a cream continuous dorsolateral line on both sides of the body that starts from the back of the eye to the tail. This cream line is bordered on both sides by a continuous dark-brown line; the venter is dark-brown with some small cream spots on their flanks. The females (Fig. 3) have a light-brown dorsum with some irregular dark-brown spots, with a cream discontinuous dorsolateral line on both sides of the body that starts from the back of the eye to the tail; the venter is brown with cream spots that form continuous longitudinal bands from the chest to the anal plate; the neck and chin are a combination of cream and brown.

In life. Based on unvouchered specimens, the dorsal coloration is brown with irregular dark spots distributed irregularly, the dorsolateral lines are obscure, and the flanks have more dark spots than the dorsum (Fig. 4).

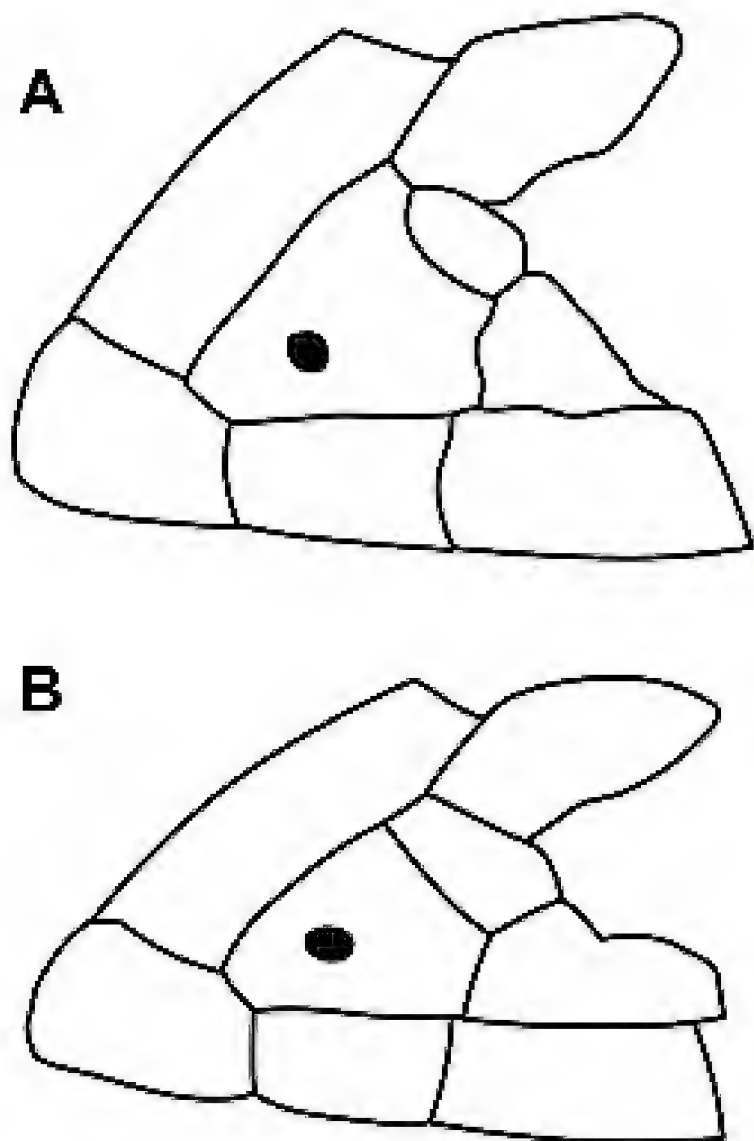


Fig. 5. Drawings of the right side showing the condition of loreal scales in *Petracola pajatensis* sp. nov. A) MUSM 3829, B) MUSM 3830.

Variation

Considerable variation is evident in the position and form of the loreal scale. The loreal scale can be incomplete, tiny, or enlarged; and can be separating, or not, the first superciliary and nasal scale; in the holotype (MUSM 3829) the right scale is incomplete and the left does not separate the nasal and first superciliary, while in three paratypes (MUSM 3830, 15985–6) the loreal scale separated the nasal and first superciliary; and in one paratype (MUSM 15987) the first superciliary and nasal are in contact on both sides (Figs. 2, 5). Variation in meristic characters is shown in Table 1. No evidence of sexual dimorphism exists in the scutellation, except for the larger number of and better developed femoral pores in males.

Etymology

The specific epithet is an adjective that recognizes Gran Pajatén archaeological remains, which, like *Petracola pajatensis* sp. nov., occurs in Río Abiseo National Park.

Habitat, Ecological Notes, and Distribution

The holotype was taken from the ground in grassland, in a rocky area dominated by bunchgrasses of *Calamagrostis*



Fig. 6. Type locality of *Petracola pajatensis* sp. nov. Photo by Ken R. Young.

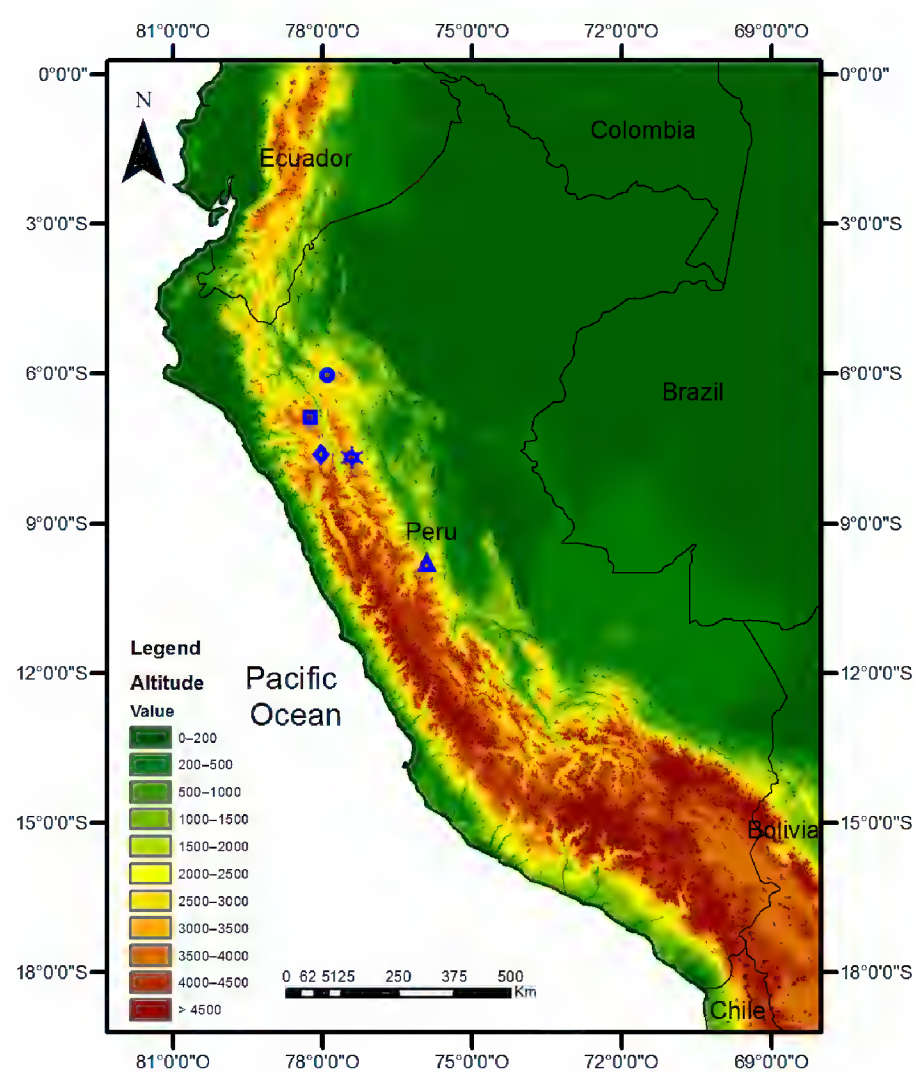


Fig. 7. Locations of the type localities of the species of *Petracola* (*P. angustisoma* = circle, *P. ventrimaculatus* = square, *P. waka* = diamond, *P. labioocularis* = triangle, *P. pajatensis* sp. nov. = star). Sources: Echevarría and Venegas (2015), Echevarría (2014), Kizirian et al. (2008), and Köhler and Lehr (2004).

sp., *Festuca* sp., *Cortaderla* sp., and *Stipa* sp. (Fig. 6). The habitat of *Petracola pajatensis* sp. nov. was previously disturbed through overgrazing and is currently undergoing secondary succession, including scattered shrubs (*Baccharis*). Multiple nest deposition sites contained elliptical egg shells (9.5–11.0 mm). The new species is known only from Los Chochos, a small valley on the western slopes of the Cordillera Oriental, south of the Huancabamba Depression, approximately 100 km south of the localities of *P. ventrimaculatus* (Fig. 7).

Table 1. Measurements and scale counts of specimens of *Petracola pajatensis* sp. nov. and *P. ventrimaculatus* examined in this paper. *only an adult male, ** the first right genial is divided, ***the anterior subocular scale is fused with freno ocular.

Characters (count or mm)	<i>Petracola pajatensis</i> sp. nov.		<i>Petracola ventrimaculatus</i>	
	Male (<i>n</i> = 2)*	Female (<i>n</i> = 3)	Male (<i>n</i> = 3)	Female (<i>n</i> = 2)
Snout vent length	60.5	52.8–65.1	60.8–71.05	48.2–59.0
Head length to ear	13.6	10.2–12.5	12.2–14.9	9.6–11
Head width	9.9	6.7–7.7	9.9–11	6.5–7.4
Supraoculars	2.0	2.0	2.0	2.0
Genials in contact	4–5**	4.0	4.0	4.0
Postoculars	2.0	2.0	2.0	2.0
Superciliaries	1–2, discontinuous	2, discontinuous	2–4, discontinuous	2–3, discontinuous
Supralabials	5.0	5–6	7.0	7.0
Supralabial scales to posteroventral angle of subocular	3.0	3.0	3.0	3–4
Subocular	3***	3.0	2–3	3–4
Infralabials	5–6	5–6	6.0	6.0
Postparietals (occipitals)	2.0	2.0	3–4	3.0
Temporals	11–15	12–15	12–18	13–14
Pregular scale rows	3.0	3.0	3.0	3.0
Gular scale rows	6.0	5–6	6.0	6.0
Scales around midbody	17–21	28–34	33–34	32–35
Longitudinal dorsal scale rows	17–21	16–20	22–23	20–23
Longitudinal ventral scale rows	8.0	8.0	10.0	10.0
Transversal dorsal scale rows	33–34	34–35	32–34	31–34
Transversal ventral scale rows	21.0	20–22	21–23	20–21
Femoral pores	6–8	2–3	4.0	3–4
Lamellae under 4 th finger	8–10	8–9	9–10	9–10
Lamellae under 4 th toe	14–15	13–14	12–13	14–15

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Luis Mamani is a biologist who graduated from the Universidad Nacional de San Antonio Abad del Cusco (Peru) and he obtained his M.Sc. degree from the Universidad de Concepción (UdeC) in Chile. Currently, Luis is a researcher at Museo de Biodiversidad del Perú (MUBI) and Museo de Historia Natural de la Universidad Nacional de San Antonio Abad del Cusco (MHNC). His current research includes systematics, taxonomy, and biogeography of the gymnophthalmid lizards from the Cordillera de los Andes.

Appendix 1. Specimens examined.

Petracola waka

PERU: Cajamarca: Baños del Inca: MUBI 4721, 4722, 4723; Cajabamba: MUBI 2609–2619, KU 135063–79; Celendin: El Sauce: MUSM 26246–26248, 26346–26351.

Petracola ventrimaculatus

PERU: Cajamarca: Celendín: MUBI 11114, 11117, 1118; Hualgayoc: MUBI 11402, 11403.

Petracola labioocularis

PERU: Huanuco: Monte Potrero: MUBI 14252, 14253, 14254, 14232, 14251; Acomayo: MUSM 13903, 13904.

Petracola angustisoma

PERU: Amazonas: Bongara: San Carlos: Achupampa: MUBI 11513.